developed to introduce aerosols containing reactant precursors into laser pyrolysis chambers. Improved aerosol delivery apparatuses for reaction systems are described further in commonly assigned and copending U.S. Patent Application Serial Number 09/188,670, now U.S. Patent 6,193,936 to Gardner et al., entitled "Reactant Delivery Apparatuses," filed November 9, 1998, incorporated herein by reference.

At page18, line 30 to page 19, line 16, please replace the paragraph with the following:

Aerosol generator 182 can operate based on a variety of principles. For example, the aerosol can be produced with an ultrasonic nozzle, with an electrostatic spray system, with a pressure-flow or simplex atomizer, with an effervescent atomizer or with a gas atomizer where liquid is forced under significant pressure through a small orifice and fractured into particles by a colliding gas stream. Suitable ultrasonic nozzles can include piezoelectric transducers. Ultrasonic nozzles with piezoelectric transducers and suitable broadband ultrasonic generators are available from Sono-Tek Corporation, Milton, NY, such as model 8700-120. Suitable aerosol generators are described further in copending and commonly assigned, U.S. Patent Application Serial No. 09/188,670, now U.S. Patent 6,193,936 to Gardner et al., entitled "REACTANT DELIVERY APPARATUSES," incorporated herein by reference. Additional aerosol generators can be attached to junction 186 through other ports 192 such that additional aerosols can be generated in interior volume 188 for delivery into the reaction chamber.

At page 27, line 24 to page 28, line 4, please replace the paragraph with the following:

In one preferred embodiment of a commercial capacity laser pyrolysis apparatus, the reaction chamber is elongated along the light beam to provide for an increase in the throughput of reactants and products. The original design of the apparatus was based on the introduction of purely gaseous reactants. The embodiments described above for the delivery of aerosol reactants can be adapted for the elongated reaction chamber design. Additional embodiments for the introduction of an aerosol with one or more aerosol generators into an elongated reaction chamber is described in commonly assigned and copending U.S. Patent application serial No. 09/188,670, now U.S. Patent 6,193,936 to Gardner et al., entitled "Reactant Delivery Apparatuses," incorporated herein by reference.

B3

At page 29, lines 4-23, please replace the paragraph with the following:

The improved reaction system includes a collection apparatus to remove the nanoparticles from the reactant stream. The collection system can be designed to collect particles in a batch mode with the collection of a large quantity of particles prior to terminating production. Alternatively, the collection system can be designed to run in a continuous production mode by switching between different particle collectors within the collection apparatus or by providing for removal of particles without exposing the collection system to the ambient atmosphere. A preferred embodiment of a collection apparatus for continuous particle production is described in copending and commonly assigned U.S. Patent application serial number 09/107,729, now U.S. Patent 6,270,732 to Gardner et al., entitled "Particle Collection Apparatus And Associated Methods," incorporated herein by reference. The collection apparatus can include curved components within the flow path similar to curved portion of the collection apparatus shown in Fig. 1.

B4

At page 35, lines 13-33, please replace the paragraph with the following:

The conditions to convert crystalline VO_2 to orthorhombic V_2O_5 and 2-D crystalline V_2O_5, and amorphous V_2O_5 to orthorhombic V_2O_5 and 2-D crystalline V_2O_5 are described in copending and commonly assigned U.S. Patent application serial number 08/897,903, now U.S. Patent 5,989,514 to Bi et al., entitled "Processing of Vanadium Oxide Particles With Heat," incorporated herein by reference. Conditions for the removal of carbon coatings from metal oxide nanoparticles is described in U.S. Patent Application Serial No. 09/123,255, entitled "Metal (Silicon) Oxide/Carbon Composite Particles," incorporated herein by reference. The incorporation of lithium from a lithium salt into metal oxide nanoparticles in a heat treatment process is described in copending and commonly assigned U.S. Patent Application Serial No. 09/311,506 to Reitz et al., entitled "Metal Vanadium Oxide Particles," and in copending and commonly assigned U.S. Patent Application Serial No. 09/334,203 to Kumar et al., entitled "Reaction Method For Producing Ternary Particles," both of which are incorporated herein by reference.

B5

At page 36, line 24 to page 37, line 5, please replace the paragraph with the following:

Because of their small size, the primary particles tend to form loose agglomerates due to van der Waals and other electromagnetic forces between nearby particles. These agglomerates can be dispersed to a significant degree. The secondary or agglomerated particle size depends on the approach used to disperse the particles following their initial formation. The degree of dispersion generally depends on the fluid/ liquid used to disperse the particles, the pH, ionic strength and the presence of dispersants, such as surfactants. Nanoparticles produced by laser pyrolysis generally can be well dispersed, as described further in copending and commonly assigned U.S. Patent Application Serial No. 09/433,202 to Reitz et al., filed on November 4, 1999, entitled "Particle Dispersions," incorporated herein by reference.

B6

At page 39, lines 6-18, please replace the paragraph with the following:

B7

Several different types of nanoscale electroactive particles have been produced by laser pyrolysis with or without additional processing. The production of vanadium oxide nanoparticles and the production of batteries based on these particles are described in copending and commonly assigned U.S. Patent Application Serial No. 08/897,778, now U.S. Patent 6,106,798 to Bi et al., entitled "Vanadium Oxide Nanoparticles," and U.S. Patent 5,952,125 to Bi. et al., entitled "Batteries with Electroactive Nanoparticles," both of which are incorporated herein by reference. Surprising high energy densities have been obtained with these vanadium oxide nanoparticles.

At page 39, lines 19-26, please replace the paragraph with the following:

B8

Similarly, silver vanadium oxide nanoparticles have been produced, as described in copending and commonly assigned U.S. Patent Applications Serial Nos. 09/246,076, now U.S. Patent 6,225,007, and 09/311,506, both entitled "Metal Vanadium Oxide Particles," both of which are incorporated herein by reference. For these materials surprisingly high specific capacities have been observed.

At page 39, line 33 to page 40, line 17, please replace the paragraph with the following:

B9

Furthermore, lithium manganese oxide nanoparticles have been produced by laser pyrolysis along with subsequent heat processing, as described in copending and commonly assigned U.S. Patent Applications Serial No. 09/188,768 to Kumar et al., entitled "Composite Metal Oxide Particles," Serial No. 09/203,414, now U.S. Patent 6,136,287 to Horne et al., entitled "Lithium

Manganese Oxides and Batteries," and 09/334,203 to Kumar et al., entitled "Reaction Methods for Producing Ternary Particles," all three of which are incorporated herein by reference. It has been observed that nanoscale lithium manganese oxide particles placed in a cathode of a lithium based battery can cycle reversibly over a larger voltage range than bulk materials. The use of nanoscale lithium manganese oxide particles in lithium based batteries is also described in U.S. Patent 5,807,646 to Iwata et al., entitled "Spinel Type Lithium-Manganese Oxide Material, Process for Preparing the Same and Use Thereof," incorporated herein by reference.

END B9

At page 40, lines 18-24, please replace the paragraph with the following:

B10

In addition, tin oxide nanoparticles have been produced by laser pyrolysis, as described in copending and commonly assigned U.S. Patent Application Serial No. 09/042,227, now U.S. Patent 6,200,674 to Kumar et al., entitled "Tin Oxide Particles," incorporated herein by reference. Tin oxide particles are suitable for use as electroactive material in a negative electrode of a lithium based batteries.

At page 42, line 31 to page 43, line 9, please replace the paragraph with the following:

B11

Lithium ion batteries use particles of a composition that can intercalate ~~lithium into~~ the negative electrode. The particles can be held in the negative electrode with a binder. Suitable intercalation compounds include, for example, graphite, synthetic graphite, coke, mesocarbons, doped carbons, fullerenes, niobium pentoxide, tin alloys, SnO_2, lithium titanium oxide, and mixtures, composites and derivative thereof. The production of tin oxide nanoparticles is described in copending and commonly assigned U.S. Patent Application Serial No. 09/042,227, now U. S. Patent 6,200,674 to Kumar et al., entitled "Tin Oxide Particles," incorporated herein by reference.

At page 52, line 33 to page 53, line 21, please replace the paragraph with the following:

B12

Several different approaches can be used to produce extremely thin electrodes. For example, nanoparticles can be dispersed to form a dispersion or slurry of the nanoparticles. The dispersion can include electroactive nanoparticles, electrically conductive nanoparticles and a binder, if used. Suitable dispersants have a reasonably high vapor pressure such that they will evaporate relatively quickly after the electrode layer is formed. The dispersant preferably dissolves the binder such that the binder mixes relatively uniformly with the particles. A variety of organic solvents, such as alcohols, ketones, acetonitrile, esters, ethers and combinations thereof, can be used as the dispersant, depending on the particular binder. Surfactants or the like can be used to further the dispersion of the nanoparticles. The formation of dispersion of nanoparticles is described further in U.S. Patent Application Serial No. 09/433,202 to Reitz et al., filed on November 4, 1999, entitled "Particle Dispersions," incorporated herein by reference. Generally, the dispersions should contain from about 5 weight percent solids to about 60 weight percent solids.

In the Claims

Please substitute the following amended claims for those currently pending:

B13

29. (Amended) A battery comprising:

a positive electrode;

a negative electrode; and

a separator between the positive electrode and the negative electrode,

wherein at least one of the electrodes has an average thickness less than about 10 microns and comprises electroactive particles having an average primary particle diameter less than about 500 nm.